Remarks

Claims 1-15 are pending. All presently stand rejected. Claims 16-19 are newly added. Reconsideration and reexamination are respectfully requested.

Drawings

Revised drawings with proposed corrections depicted in red are enclosed herewith (Sheets 1, 8). Changes have been made to Figure 1b without the introduction of new matter to conform that Figure with the Specification. Figure 8a now includes a legend including (X) and (Y) so that the features defined in claims 7-8 are now explicitly depicted.

Approval of the proposed corrections is requested.

Claim Rejections - 35 U.S.C. § 112

Claims 7-8 were rejected under 35 U.S.C. § 112, ¶ 1. Upon the approval of the proposed drawing changes depicted in Figure 8a, these rejections should be rescinded.

Claim Rejections - 35 U.S.C. § 102

Claims 1-4, 6-8 & 11-13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tategami et al. (Figure 4) or Watanabe et al. (Figure 20).

The invention relates to a multi-purpose exchanger of thermal energy (*e.g.* a condenser/radiator combination) by brazing the assembly as a single unit. In one embodiment, the disclosed invention calls for a serpentine radiator fin and a condenser fin (in the case of a condenser/radiator assembly) that are separated by one or more thermal breaks. This thermal barrier comprises "a slit which is formed without removal of material" when the edges of the slit are separated in a scissor-like operation (*e.g.* Figure 2e). Specification, 3:19. When the edges of the slit are separated (*e.g.* Figure 2e), the slit inhibits the flow of heat energy across the width of the strip. See, also Figures 1b, 1c & 1d. The slit is depicted by the reference numeral 50.

One attribute of slits 50 being formed without the removal of material is that unwanted debris does not clutter the teeth of forming rolls during the manufacturing operation. Manufacturing economics are thereby improved by the avoidance of an unnecessary cleaning step, while prolonging tool life.

The thermal fuse or bridge is depicted by the reference numeral 52 (Figure 1c). Optionally, the thermal fuses 52 may or may not be broken after brazing. Specification, 7:1-3. Such a selective activation function permits the designer to promote structural integrity during pre-braze assembly and enable a localized transfer of heat. Thus, the thermal fuse 52 fulfills the dual role of adding strength during assembly, while degrading fin junctions during operation. Specification, 7:26-27.

Claim 1 has been amended to clarify that the thermal break or slit "is made without the removal of material". In contrast, Tategami et al. ('540) discloses "cut outs intermediate the two unit heat exchangers parts". The notches (reference numeral 2) ". . . are provided by cutting out portions of the fin 1 . . ." ('540, 3:47). Thus, as disclosed and depicted, the '540 reference discloses the removal of material.

Similar comments are applicable to Watanabe et al. ('341). (See, slots 41a. '341, 7:45). Additionally, neither of those references disclose a thermal fuse structure. Further, claim 2 has been amended so that it calls for a "slit [having] a length that exceeds one convolution". That structure is depicted in Figure 1d (reference numeral 50).

Claims 2-4, 6-8 & 11-13 rise or fall within claim 1. They are patentable over the cited references for the same reasons as advanced above.

Claims 1-4, 6-8, 10, 12-13 & 15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Makino et al. (Figures 21-23) or Nishishita et al. (WO 99/26035). Similar comments to those made above are applicable here. As claimed, the invention calls for a slit that is formed without removal of the material, having a length which exceeds one convolution. No such structure is disclosed in either Makino et al. (slots 67) or Nishishita et al. (slots 51).

Corresponding arguments apply to the rejection of claims 1-8, 12-13 & 15 under 35 U.S.C. § 102(b) based on Nishishita et al. (WO99/53253), which discloses no slit or thermal break corresponding to that claimed.

Claims 1-4, 6-10 & 12-13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sugimoto et al. (5,992,514) or Yamanaka et al. (Figures 3-4). The '514 reference discloses a slot 47 having a width L_S. Yamanaka et al. (Figures 3-4) depicts a slot 22d. In the claimed invention, the slit is formed without the removal of material.

Claims 1-4, 6-8, 10 & 12-13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nishishita et al. (Figure 4) (WO 98/25092). For the reasons advanced above, this reference likewise does not depict the invention as now claimed (a slit that is made without the removal of material and a thermal fuse which locally connects the first and second fins between adjacent edges thereof). Again, Figure 4 of the reference discloses slot that requires the removal of material in order to be formed.

Claims 1-4, 6-8, 10 & 12-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Sugimoto et al. (Figure 15) (6,189,603) or Ozaki et al. (6,213,196). Figure 15 of the '603 reference discloses slots between adjacent fins which require for their formation the removal of material.

Similarly, for Ozaki et al. ('196), the connection member (f) of the '196 reference fails to respond to the thermal fuse required by the invention as now claimed. In contrast to claim 16, Ozaki et al. ('196) depicts a corrugated condenser fin with a flat top 122a. Noteworthy also is that the notch (s) disclosed in the '196 reference (Figure 5) extends over an integral number of convolutions (Figure 5, '196). In contrast, as depicted in this Specification, Figure 1d (the slit 50) may extend over more than one convolution (claims 17-18). It may be of uniform or non-uniform length. Specification, 6:25-26.

Claims 1-4, 6-10, & 12-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Sugimoto et al. (Figure 15) (6,357,518), Ozaki et al. (6,267,174) or Sasano et

al. Figure 15 of the '518 reference discloses a slot that requires the removal of material. Similar comments are applicable to Ozaki et al. '174 (*see, e.g.* Figure 3, reference letter (s)). Sasano '445 (reference letter (s) Figure 4)).

Claims 1-4, 6-8, 10 & 12-14 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Sugimoto et al. (Figures 4A-C and 12A-C, 6,357,518). In the '581 reference, "The slits is formed by cutting out a portion between the condenser fin 112 and the radiator fin 212 . . ." '518, 4:21-23.

Other Matters

Claims 16-18 have been added to define the invention more clearly and to distinguish over cited art. Claim 19 has been added as a method claim. Support lies in the Specification between 8:24-10:15.

All formal and substantive requirements for patentability now appear to have been met. Accordingly, a Notice of Allowance is solicited. If a telephone interview would expedite prosecution, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO SPECIFICATION

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FIGURE 1(b) is a cross-sectional view taken along the line 1b-1b of FIGURE 1(a). A first core 12 is, for example, a condenser that is placed on the upwind side of the multiple core exchanger of thermal energy 10. A second exchanger of thermal energy 30 (such as, but not limited to a radiator) is juxtaposed therewith. Both cores 12, [24] 30 are disposed between the side manifolds shown in FIGURE 1(a).

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A thermal break comprising a slit 50 (FIGURES 1(c)-(d) is roll formed without removal of material between the first and second upper and lower folds, and the first and second walls. The slit 50 insulates heat conductivity between the first and second fins, and may be of uniform or non-uniform length.

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Turning now to FIGURES 2(a)-(f), there are depicted other views of the thermal break comprising a slit 50 and a thermal fuse 52 (FIGURE 2(e)) between condenser and radiator fins. In FIGURE 2(b), the slit 50 is shown with displaced opposing edges, thereby creating one form of the thermal break. In the example shown in FIGURE 3, the thermal fuse appears once every 6.5 convolutions. FIGURES 2(c)-(f) are sectional views taken along the respective sectional lines illustrated in FIGURE 2(a). FIGURE 2(c) illustrates a configuration wherein the first fin 16 has one array of louvers extending between the edges thereof. FIGURE 2[(e)] (d) illustrates a configuration wherein the louver (in the example shown, of the second core 34) are split. FIGURE 2(e) illustrates a thermal break roll formed by fin separation and the slit 50 formed between the first and second upper and lower folds, and the first and second walls. For comparison, FIGURE 2(f) illustrates a neutral surface of either fin.

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A multiple core exchanger of thermal energy, through which a medium passes to exchange thermal energy with fluid flowing through channels of one or more of the multiple cores of the multiple core exchanger of thermal energy, the multiple core exchanger of thermal energy comprising:

a first core having a plurality of first channels through which a first fluid flows and a first <u>serpentine</u> fin <u>and louvers</u> disposed between at least some of the first channels to facilitate an exchange of thermal energy between the first fluid and the medium;

a second core in thermal communication with the first core, the second core having a plurality of second channels through which a second fluid flows and a second <u>serpentine</u> fin <u>and louvers</u> disposed between at least some of the second channels to facilitate an exchange of thermal energy between the second fluid and the medium;

the second fin being integrally formed with the first fin so that the second fin has a shape which complements that of the first fin; [and]

<u>a plurality of thermal fuses which locally connect the first and the second fins between adjacent edges of the first and second fins; and</u>

a <u>plurality of</u> thermal break<u>s, each</u> comprising a slit <u>that is cut without the removal of material by teeth in intermeshing forming rolls with the serpentine fins and louvers in one pass through the forming rolls</u>.

2. (Amended) The multiple exchanger of thermal energy of claim 1, [further having]

<u>wherein the slit has a length that exceeds one convolution.</u>

[a thermal fuse which locally connects the first and the second fins between adjacent edges of the first and second fins.]

16. (New) The multiple core exchanger of thermal energy of claim 1 wherein the serpentine fins include walls that are connected by bent radii.

17. (New) The multiple core exchanger of thermal energy of claim 16 wherein at least one of the slits have a length that extends over more than one corrugation.

18. (New) The multiple core exchanger of thermal energy of claim 17 wherein the slits have a non-uniform length.

19. (New) A method for continuously roll forming a serpentine fin with a thermal break and a thermal fuse, comprising the step of:

passing a narrow flat sheet of metal between forming rolls that simultaneously form a serpentine fin having convolutions, cut louvers, cut a thermal fuse that may be broken or locally melted during brazing, and cut a thermal break comprising a slit having a length that exceeds one convolution without the removal of material to a prescribed width and pattern.